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Science 9 H

Lab Report

The Plan

The plan was to change American pennies into gold plated pennies through various procedures. We chose to do this because it sounded interesting to change the appearance of pennies so that they look like gold. The method that we used was to first put the penny in a 3M solution of sodium hydroxide with zinc in it. Then we would heat it until it is near boiling. This turns the penny in to silver and then we would heat it for a short amount of time until the surface of the penny turns into a gold color.

The Results

* Qualitative Data (Observations)
  1. Changing the penny into a silver colored penny

The sodium hydroxide and zinc seem to react when they are heated together and this makes the color of the penny silver. Also, when there was more zinc in the solution, the penny reacted quicker.

* 1. Changing the silver colored penny into a gold color penny

Burning the coin too long makes it lose its gold color and turns into a dark brown color. Also, when the coin has a gold color to it, the color changes as time pass. It may first seem like gold, but later changes into becoming a bright yellow-gold color. This seems to happen as it cools down or is left with the air surrounding it.

* No Quantitative Data

Science concepts and ideas



Figure Galvanized coin being heated

When you put zinc (Zn) into the heated sodium hydroxide (NaOH), they react with each other. They form a soluble sodium zincate (Na2ZnO2) which again reacts when it touches the surface of the penny. This reaction forms metallic zinc that covers the penny and changes the color into silver. This process is called galvanization (Look at figure 1 and 2).

Figure 2 This is the color that galvanized products have

Zinc and copper, when heated, forms brass. Brass is an alloy of zinc and copper that has a bright gold color to it. Although the original American penny has a small amount of zinc in it, it is not enough to form brass with copper when heated. Therefore, covering the penny with metallic zinc forms the right proportion of zinc and copper to form brass. When using the flame or another heat source to heat the penny covered with metallic zinc, the zinc and the copper form brass (Look at Figure 3 and Figure 4).

Figure 3 The surface of the coin turning into a gold color



I learned that doing your own experiment takes a lot of effort. It requires a long time of searching to actually get an idea and learn about the background of your experiment. Next time, I will research about the experiment before actually doing it. This will help me understand more about what is happening in the experminent.



Figure 4 A coin that has a gold color to it before it turns bright yellow-gold

Sources

<http://chemistry.about.com/od/chemistryhowtoguide/a/goldsilverpenny.htm>

<http://www.plasticsportal.net/wa/plasticsEU~en_GB/portal/show/common/plasticsportal_news/2007/07_226> (Image)